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रेडियो आवृति केबल

भाग 2 केबल कृत वितरण तंत्र में उपयोग के लिए एकल इकाई समाक्ष केबलों की विशेष अपेक्षाएँ

Indian Standard

RADIO FREQUENCY CABLES

PART 2 PARTICULAR REQUIREMENTS FOR SINGLE-UNIT COAXIAL CABLES FOR USE IN CABLED DISTRIBUTION SYSTEM

UDC 621·315·212·029·5 : 621·397·743

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 1995

Price Group 3

Wires and Cables for Electronic Equipment Sectional Committee, LTD 18

FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wires and Cables for Electronic Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

The series of standards on Radio Frequency Cables comprise of the following parts:

Part 1	General requirements and tests for single-unit coaxial cables for use in cabled distribution systems
Part 2	Particular requirements for single-unit coaxial cables for use in cabled distribution systems

This standard specifies the particular requirements of solid polyethylene and cellular polyethylene coaxial cables for use in cabled distribution system.

For the purpose of deciding whether a particular requirement for this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard
RADIO FREQUENCY CABLES
PART 2 PARTICULAR REQUIREMENTS FOR SINGLE-UNIT COAXIAL CABLES FOR USE IN CABLED DISTRIBUTION SYSTEM

1 SCOPE

This standard specifies dimensions, construction details and requirements of solid polyethylene and cellular polyethylene (cellular is same as air/plastic dielectric construction) coaxial cables for use in cabled distribution system such as cable TV.

2 REFERENCES

2.1 The following standards are referred to in this standard:

IS No.	*Title*
5026 : 1987	General requirements and tests for radio frequency cables (*first revision*)
9943 : 1981	Characteristic impedances and dimensions of radio frequency coaxial cables
13176 : 1991	PVC insulation and sheath of telecommunication cables
14131 (Part 1) : 1994	Radio frequency cables : Part 1 General requirements and tests for single-unit coaxial cables for use in cabled distribution system

3 TERMINOLOGY

3.1 For the purpose of this standard, the terms and definitions of IS 5026 : 1987 and IS 1431 (Part 1) : 1994 shall apply.

4 GENERAL REQUIREMENTS AND TESTS

4.0 Provisions of **3.0** of IS 14131 (Part 1) : 1994 shall apply.

4.1 Frequency Range

Provisions of **3.1** of IS 14131 (Part 1) : 1994 shall apply.

4.2 Attenuation and Classification

Provisions of **3.2** of IS 14131 (Part 1) : 1994 shall apply.

4.3 Mean Characteristic Impedance

Provisions of **3.3** of IS 14131 (Part 1) : 1994 shall apply.

4.4 Return Loss

Provisions of **3.4** of IS 14131 (Part 1) : 1994 shall apply.

4.5 Screening Efficiency

Under consideration.

5 GENERAL CONSTRUCTION

5.1 The outline constructional feature of cable is shown in Fig. 1.

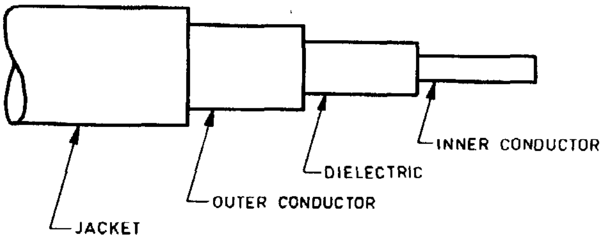

FIG. 1 OUTLINE DRAWING — COAXIAL CABLE

6 CONSTRUCTIONAL REQUIREMENTS

6.1 The constructional details of coaxial cable with solid polyethylene dielectric are given in Table 1.

6.2 The constructional details of coaxial cables with cellular polyethylene dielectric are given in Table 2.

7 PERFORMANCE REQUIREMENTS

7.1 The requirements of the coaxial cables with solid polyethylene dielectric are given in Table 3.

7.2 The requirements of the coaxial cables with cellular dielectric are given in Table 4.

Table 1 Constructional Details of Coaxial Cables with Solid Polyethylene Dielectric

(*Clause* 6.1)

All dimensions in millimetres.

Sl No.	**Item**	**Details**	**Size Designation**			
			4CA	5CA	7CA	11CA
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Inner conductor	Solid annealed bare copper (diameter)	0.6 + 0.01 - 0.0	0.8	1.1	1.7
ii)	Dielectric	Solid polyethylene (diameter)	3.7 ± 0.20	4.80 ± 0.20	7.20 ± 0.20	11.5 ± 0.20
iii)	Outer conductor	a) I-Laminated longitudinal aluminium composite tape				
		Thickness, *Min*	0.050	0.050	0.075	0.075
		Overlap, *Min*	3%	3%	3%	3%
		b) II-Braid of tinned copper wire				
		Coverage, *Min*	80%	80%	80%	80%
		Diameter, *Min*	0.12	0.15	0.15	0.15
iv)	Barrier layer	Polyethylene terephthalate/ polyester transparent tape overlap, *Min*	20%	20%	20%	20%
v)	Jacket	a) PVC Type TM2 (as per IS 13176 : 1991) sheath thickness, *Min*	0.6	0.8	0.9	1.0
		b) Maximum outer diameter over jacket	6.3	7.3	11.0	15.5
		c) Colour	← Black →			

NOTES

1 These types of cables are suitable for radio frequency connector with screw coupling typically for use in 75 Ω cabled distribution system (Type F).

2 The other designs of cables to be considered later.

Table 2 Constructional Details of Coaxial Cables with Cellular Polyethylene Dielectric

(*Clause* 6.2)

All dimensions in millimetres.

Sl No.	Item	Details	Size Designation			
			4CA4	5CA4	7CA4	10CA4
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Inner conductor	Solid annealed plain copper conductor of copper coated steel wire (diameter)	0.8	1.1	1.63	2.2
ii)	Dielectric	Cellular foam polyethylene (diameter)	3.70 ± 0.20	4.80 ± 0.20	7.24 ± 0.25	9.80 ± 0.25
iii)	Outer conductor	a) I-Laminated longitudinal aluminium composite tape				
		Thickness, *Min*	0.050	0.050	0.075	0.075
		Overlap, *Min*	3%	3%	3%	3%
		b) II- Braid of tinned copper wire				
		Coverage, *Min*	80%	80%	80%	80%
		Diameter, *Min*	0.12	0.15	0.15	0.15
iv)	Migration barrier	Polyethylene terephthalate/ polyester transparent tape minimum overlap	20%	20%	20%	20%
v)	Jacket	a) PVC type TM2 (as per IS 13176 : 1991) sheath thickness, *Min*	0.6	0.8	0.9	1.0
		b) Maximum outer diameter over jacket	6.3	7.3	11.0	14.0
		c) Colour	← Black →			

Tables 3 Requirements of Coaxial Cables with Solid Polyethylene Dieletric

(*Clause* 7.1)

Sl No.	**Tests**	**Size Designation**				**Clause Ref of IS 5026 : 1987**
		4CA	5CA	7CA	11CA	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Dielectric strength V_{rms}	5 000	7 000	10 000	12 000	6.7
ii)	Spark test V_{rms} over jacket	5 000	5 000	5 000	5 000	6.6
iii)	Insulation resistance between inner conductor and outer conductor M ohm/km, *Min*	2 000	2 000	2 000	2 000	6.8
	ENGINEERING INFORMATION					
iv)	Mean characteristic impedance at 200 MHz (ohms)	75 ± 2	75 ± 2	75 ± 2	75 ± 2	6.10
v)	Capacitance pF/m (Nom)	67.3	67.3	67.3	67.3	6.13
vi)	Velocity of propagation (Nom)	66%	66%	66%	66%	A-3 of Appendix A
vii)	Attenuation db/100 m, *Max*					
	at 200 MHz	20	16	10	8	6.11
	at 800 MHz	40	32	20	16	
viii)	DC resistance at 20°C (ohms/km, *Max*)	64	36	18.5	8.7	—
ix)	Operating frequency, *Max*	1 GHz	1 GHz	1 GHz	1 GHz	—
x)	Operating temperature	-5 to 70°C	-5 to 70°C	-5 to 70°C	-5 to 70°C	—
xi)	Bending radius, *Min*	60 mm	75 mm	115 mm	150 mm	—
xii)	Pull strength, kg, *Max*	20	25	60	120	—
xiii)	Temperature coefficient of attenuation	← Under consideration →				—
xiv)	Dip table cm/span of different length	← Under consideration →				—
xv)	Screening efficiency	← Under consideration →				—

Table 4 Requirements of Coaxial Cables with Cellular Dielectric
(*Clause* 7.2)

Sl No.	**Tests**	**Size Designation**				**Clause Ref of IS 5026 : 1987**
		4CA4	5CA4	7CA4	11CA4	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Dielectric strength V_{rms}	800	1 600	2 000	2 500	6.7
ii)	Spark test on jacket V_{rms}	5 000	5 000	5 000	5 000	6.6
iii)	Insulation resistance M ohm/km, *Min*	10 000	10 000	10 000	10 000	6.8
ENGINEERING INFORMATION						
iv)	Mean characteristic impedance at 200 MHz (ohms)	75 ± 3	75 ± 3	75 ± 2.5	75 ± 2.5	6.10
v)	Capacitance pF/m (Nom)	53	53	53	53	6.13
vi)	Velocity of propagation (Nom)	82%	82%	82%	82%	A-3 of Appendix A
vii)	Attenuation (db/100m, *Max*)					
	at 200 MHz	16	10	8	6	6.11
	at 800 MHz	32	20	16	12	
viii)	Return loss db, *Min*					
	30 - 300 MHz	18	18	23	23	6.12
	300 - 460 MHz	NA	NA	20	20	
	460 - 585 MHz	NA	NA	19	19	
	585 - 960 MHz	NA	NA	18	18	
ix)	DC resistance at 20°C inner conductor, *Max* (ohms/km)	36	18.5	8.7	4.76	
x)	Operating frequency, *Max*	800 MHz	800 MHz	800 MHz	800 MHz	
xi)	Operating temperature	-5 to 70°C	-5 to 70°C	-5 to 70°C	-5 to 70°C	
xii)	Bending radius, *Min*	60 mm	75 mm	115 mm	150 mm	
xiii)	Maximum pull strengtn	←— Under consideration —→				
xiv)	Temperature coefficient of attenuation	←— Under consideration —→				
xv)	Dip table cm/span of different length	←— Under consideration —→				

NOTES

1 The above design of cables are not recommended for direct underground burial.

2 These cables should be supported with suitable steel wire/rope for overhead installations.

3 The messengered type of cables (steel wire/rope co-extended with jacket) are permitted.

4 Jacket material type of IS : 5026 : 1987 shall be equivalent to Type TM2 of IS 13176 : 1991.

5 Jacket material should be Type 8 of IS 13176 : 1991 for extremely low temperature regions.

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Amendments Issued Since Publication

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